

Steel Construction: Prefabrication - Minimum Criteria for Shop Facilities

Scope Statement

Ensure that the Fabricator meets the UDOT minimum criteria for structural steel fabrication and painting. Verify that the shop facilities provide sufficient lifting capacity, an adequate physical plant, and acceptable equipment.

Quality Assurance performed by the Department may include verification of any or all steps marked "QA." Quality Assurance may order back-up radiographs as determined by the Materials Engineer.

Procedure

Provide proof of AISC Category III certification or approval by the Materials Engineer.

Shop assembly of field connections for trusses, girders, and arches may be performed outside the shop building.

Damages that result from ordering materials prior to the shop drawing approval are at no additional cost to the Department unless the State makes changes in the principal controlling dimensions and material properties, after the opening bids.

Do not begin shop work prior to shop drawing approval.

QC/QA

1. Provide each work area with cranes that have a combined rated capacity equal to the weight of the heaviest fabricated assembly for shipment.
2. Ensure that alternate lifting and turning facilities are approved by the Materials Engineer.
3. Supply lifting chains with softeners to prevent damage to material corners during lifting and turning.
4. If hooks are used for lifting, ensure sufficient jaw and throat width to prevent damage to flanges or web-to-flange welds.
5. Prevent overstress and distortion when lifting long slender members by providing spreader beams or multiple cranes.
6. Ensure that any fabrication, welding, and painting done outside the shop is thoroughly protected from weather or other conditions and approved by the Materials Engineer.
7. Cut, fit, weld, and paint in dry areas.
8. Conduct welding in areas kept at a minimum of 0 degrees F.
9. In painting areas, maintain the steel at a minimum of 40 degrees F. during application of paint and until the paint is dry.

10. Provide fully-automated welding equipment subject to modification by other provisions of the Contract Documents for:

- Making flange-to-web welds
- Attaching all stiffener to the webs of the welded plate girders when accessible
- Making web-to-flange welds in box girders, arches, towers, and truss web and chord members

11. Use semi-automatic (hand-guided) or fully-automated welding equipment for all other principal welds.

12. Limit the use of Manual-Shield Metal Arc process to:

- Welding connection plates to rolled beams
- Welding bearing assemblies
- Making minor detail attachments
- Handling welding applications that do not employ automatic or semi-automatic welding equipment because access is limited, or the location of short length welds is isolated

Steel Construction: Prefabrication - General Requirements

Scope Statement

Subject all fabricated products that are furnished to State shop inspection unless otherwise provided in the Contract Documents or waived by the Materials Engineer.

Quality Assurance performed by the Department may include verification of any or all steps marked "QA." Quality Assurance may order back-up radiographs as determined by the Materials Engineer.

Procedure

The State accepts products from approved mills based upon a certified Mill Test report of the plates, shapes, castings, and/or forging as appropriate.

The Materials Engineer will inspect and approve all producing mills, fabricators, and/or foundries outside the United States and Canada prior to beginning the work at no additional cost to the Department.

No welding on fabrication errors or misfits shall be performed without prior approval of the Engineer.

The State Inspector may inspect and/or test all materials by visual, destructive, or nondestructive methods to evaluate that the materials meet the specified properties.

The Fabricator must have a quality control program approved by the Materials Engineer and supervised by an American Welding Society QC-1 certified welding Inspector.

Obtain a copy of the Fabricator's QC plan and procedures, and determine a contact person to represent the Fabricator.

QC/QA

1. Do not use stock steel purchased from a warehouse for use in a main member without conducting mill inspection, unless prior approval is given by the Materials Engineer.
2. Obtain a copy of the contract plans and special provisions immediately after the contract is finalized.
3. Review for changes from the standard specifications, unusual design details, or other items unique to the project.
4. Notify the Fabricator of inspection requirements.
5. Schedule a prefabrication conference to clarify:
 - Specification and inspection requirements (if required because of project size)
 - Fabricator's past performance
 - Unusual design requirements and/or specification changes
6. Before fabrication, obtain the following:
 - AISC Category III certificate or UDOT equivalent
 - Approved shop drawings
 - Approved weld procedure specifications and tests
 - Welders test reports for each operator, process, and position as required by AWS Specifications. (The QC inspector may be required to witness welders tests for personnel who are not certified.)
 - A letter from the Fabricator that states the certified welders have been using the processes without an interruption of more than six months since being certified
 - Three copies of all steel mill test reports
 - Three copies of certifications of welding wire, fluxes, or shielding gases
 - Three copies of certifications of studs, bearing pads, and other sundry materials
 - UDOT test reports on paint
 - An extra elastomeric bearing pad to be used by UDOT lab for testing
7. Notify the Fabricator that the steel plate must be ordered with in-mill inspection by UDOT.
8. Schedule a UDOT representative to witness testing at the mill to verify steel heats, if ordered by UDOT.
9. Complete one Girder Inspection Report (G.I.R.) for each girder fabricated using approved shop drawings.
10. Inspect the Fabricator's shop equipment and physical plant.
11. Inspect welding equipment condition and ensure that meters are calibrated for amp, volts, etc.
12. Check the location and holding area of the rod oven.

13. Ensure that the storage area for wire, flux, and rod is warm and dry.
14. Verify that the low hydrogen rod is stored in sealed metal cans before it is placed in the rod oven.
15. Evaluate material handling equipment for steel plate to ensure that no damage will occur during handling. Store plate above ground on skids. Use proper softeners to prevent chain gouges.
16. Verify that the Fabricator uses an approved identification transfer procedure. This procedure must assure that each piece of steel incorporated into a main member maintains its identity as the plate is cut into smaller pieces.
17. Determine how welds will be identified and where heat and weld identification will be placed on the girders.
18. Inspect the steel plate prior to fabrication for dimension, mill rolling defects, scabs, rough surfaces, mill repairs, and plate edges for possible lamination, etc.
19. Compile a portfolio containing all G.I.R.s, material certification papers, weld procedure specifications, welder's test reports, correspondence, and nondestructive testing reports.
20. Ensure that each girder has a separate I.D. number.